Essential Fish Habitat project status report

Reporting date: Nov 16, 2007

Project number: 2007-12

Title: **Habitat Influence on Rearing Condition and Overwinter Survival of Juvenile Capelin (*Mallotus villosus*)**

PIs: J. Vollenweider, J. Hudson, R. Heintz, E. Calvert

Funding year: FY 2007

Funding amount: $57.9K

Status: ☐ Complete ☒ Incomplete, on schedule ☐ Incomplete, behind schedule

Planned completion date if incomplete: Field work will be completed in April 2008. Data summarization, analysis and report/manuscript drafting will be completed over the summer of 2008.

Reporting: Have the project results been reported? If yes, where were the results reported? The project results have not been reported. A cruise report from the first research cruise of year 2 of the study has been attached.

Results: What is the most important result of the study? Data has not been analyzed yet, however, using observations from the field, we can conclude that Glacier Bay has considerably more productive habitat for juvenile capelin than Berners Bay or Fritz Cove.

EFH Status Report

16 November 2007

Habitat Influence on Rearing Condition and Overwinter Survival of Juvenile Capelin (*Mallotus villosus*)

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On November 21, 2007, we completed the first research cruise (pre-winter observation) for the 2nd winter field season of the project. During the 7-day cruise, we revisited the previously-established acoustic survey line in Berners Bay, performed CTD casts and zooplankton tows at the 14 stations, and used mid-water trawl to collect samples of juvenile capelin for morphometric and chemical analyses (see figure 1). We also established a study area in Muir Inlet, Glacier Bay using previous reports of larval capelin during summer[1]. Specifically, we examined the southern portion of Muir Inlet on a scale similar to that of Berners Bay, including the area of Adams Inlet south to Caroline Shoals (see figure 2). In this area, juvenile capelin were considerably more abundant than observed in Fritz Cove during year 1 and Berners Bay in both years (see figure 3 for example of acoustic echogram). In addition, we performed a broadscale survey of the northern portion of Muir Inlet, where juvenile capelin appear to be less abundant. Throughout Muir Inlet, we used the same sampling procedures as in Berners Bay, including acoustic surveys, CTD and zooplankton casts at 17 stations, and mid-water trawl for sample collection.

Trawl catches were immediately sorted by species on board the vessel. Juvenile (age 0) and adult capelin were wrapped in cellophane, placed in labeled plastic bags, and frozen. Zooplankton samples were placed in labeled plastic sample bags and preserved with 10% formalin (in sea water). Zooplankton and fish samples will be processed between December 2007 and March 2008. Zooplankton will be identified and enumerated. Zooplankton densities will be used to generate an index of prey availability for comparisons within and between bays. All capelin will be measured for fork length; a subset of fish from each bay will be measured for wet mass and gut contents assessed for prey types and stomach fullness. Length frequency distributions will be produced for each bay and compared to post-winter distributions for evidence of overwinter size-selective mortality. Proximate composition (i.e. % lipid, protein, and water) and energy density will be measured for a subset of fish. From these data we will compare allometric relationships between size and lipid and protein content and energy density. ANCOVA will be used to compare pre-winter energy allocation and overwinter energy consumption strategies of juvenile capelin between bays. Biophysical habitat parameters will be used to explain differences in overwinter survival and energetics between bays.

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[1] Arimitsu ML, Piatt JF, Litzow MA, Abookire AA, Romano MD, Robards MD (In draft) Distribution and spawning dynamics of capelin (Mallotus villosus) in Glacier Bay, Alaska: A cold water refugium. U.S. Geological Survey – AK Science Center, 3100 National Park Rd, Juneau AK, 99801.

A post-winter research cruise is planned during which time similar measurements will be taken to estimate overwinter energy consumption and size-selective mortality of juvenile capelin.

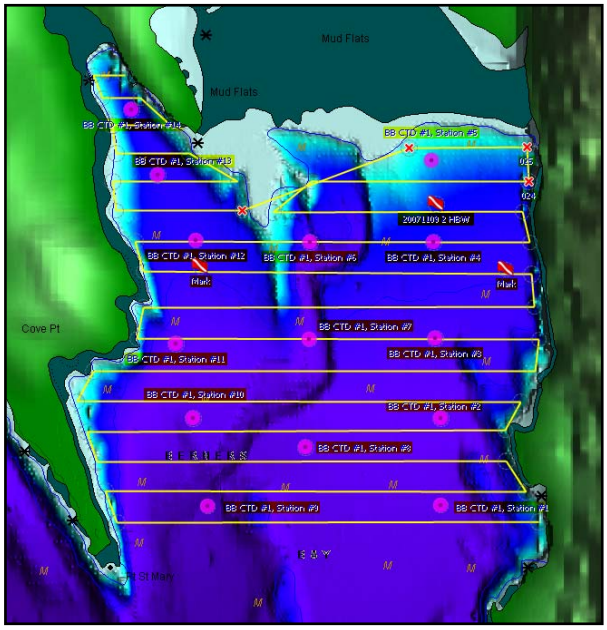

Figure 1. Berners Bay study site, depicting acoustic transect line and 14 CTD/zooplankton sampling stations.

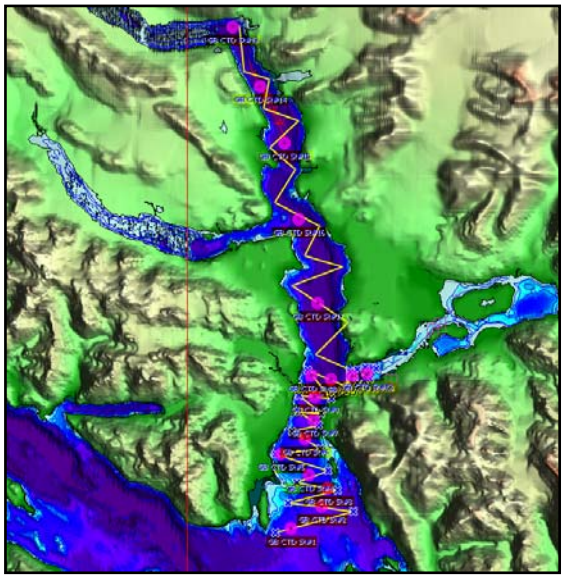
Figure 2. Muir Inlet study site, depicting acoustic transect line and 17 CTD/zooplankton sampling stations.

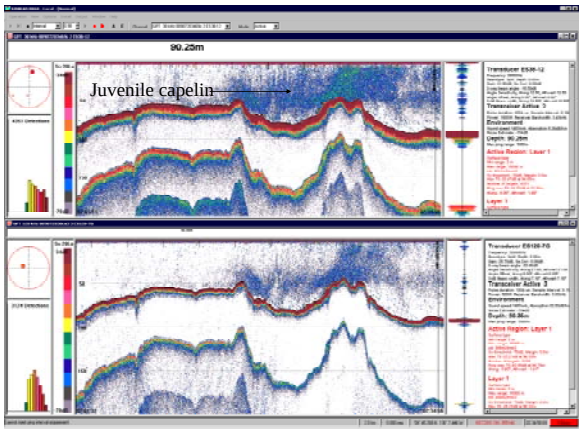

Figure 3. Echogram of juvenile capelin in Muir Inlet, Glacier Bay.